Noise Assessment

Delmore Residential Development, Wainui

Vineway Limited

[redacted]

Prepared by:

SLR Consulting New Zealand

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Revision Record

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1.0	18 December 2025	[redacted]	[redacted]	[redacted]

Basis of Report

This report has been prepared by SLR Consulting New Zealand (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Vineway Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Acronyms and Abbreviations

A' weighted	A frequency adjustment which represents how humans hear sounds.
AUP	Auckland Unitary Plan Operative in part.
dB	Decibel
dBA	'A' weighted decibel
Hz	Hertz
Impulsive noise	Noise with a high peak of short duration, or sequence of peaks.
Intermittent noise	Noise which varies in level with the change in level being clearly audible.
L_{Aeq}	The 'A' weighted equivalent noise level. It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.
L_{Amax}	The A' weighted maximum sound pressure level of an event.
LP or SPL	Sound Pressure Level.
Lw or SWL	Sound Power Level.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 "Measurement of Environmental Sound".
NZS 6802:2008	New Zealand Standard NZS 6802:2008 "Assessment of Environmental Noise."
NZS 6803:1999	New Zealand Standard NZS 6803:1999 "Acoustics – Construction Noise."
Octave-band	A frequency band where the highest frequency is twice the lowest frequency.
Special Audible Characteristic	Noise containing a prominent tonality or impulsive character.

1.0 Introduction

The Delmore Residential Development proposal (the project) comprises development of approximately 1,200 residential lots in Wainui (Upper Ōrewa), Delmore. The project would be undertaken in two stages, with each stage being separated into sub-stages.

SLR has been commissioned to undertake an assessment of acoustic effects associated with aspects of the project.

The assessment evaluated compliance with the relevant noise and vibration limits and identified any necessary mitigation measures to achieve compliance with the requirements of Auckland Unitary Plan (AUP).

The assessment is based on information contained in the following project documents:

- *Delmore, Vineway, Site Plans*, prepared by Terra Studio, dated 13 December 2025.
- Earthworks drawing set titled *Delmore Stage 1*, prepared by McKenzie and Co, dated 21 November 2025.
- Earthworks drawing set titled *Delmore Stage 2A and B*, prepared by McKenzie and Co, dated 20 November 2025.
- Earthworks drawing set titled *Delmore Stage 2B2, 2B3 and 2C*, prepared by McKenzie and Co, dated 20 November 2025.
- Report titled Delmore Water and Wastewater Treatment Plant Design Report – For Consenting, prepared by Apex Water, dated 25 November 2025.
- Report titled *On Site Wastewater – 88, 130, 133 Upper Orewa Road and 53A, 53B, 55 Russell Road, Orewa*, prepared by Commute.

2.0 Project Description and Site Location

The assessment comprised consideration of the following activities for both stages of the project:

- Construction noise and vibration emission associated with the civil site works.
- Operational noise and vibration emission from the proposed new wastewater and water treatment plant (WWTP), located within Stage 1.

The nearest proposed residential lot is more than 350 m from State Highway 1 (SH1), therefore noise impacts from SH1 at the proposal has not been considered further.

The site location and stage layouts are shown in **Figure 1**, **Figure 2**, and **Figure 3**.

Figure 1 Propose Site Plan – Overall

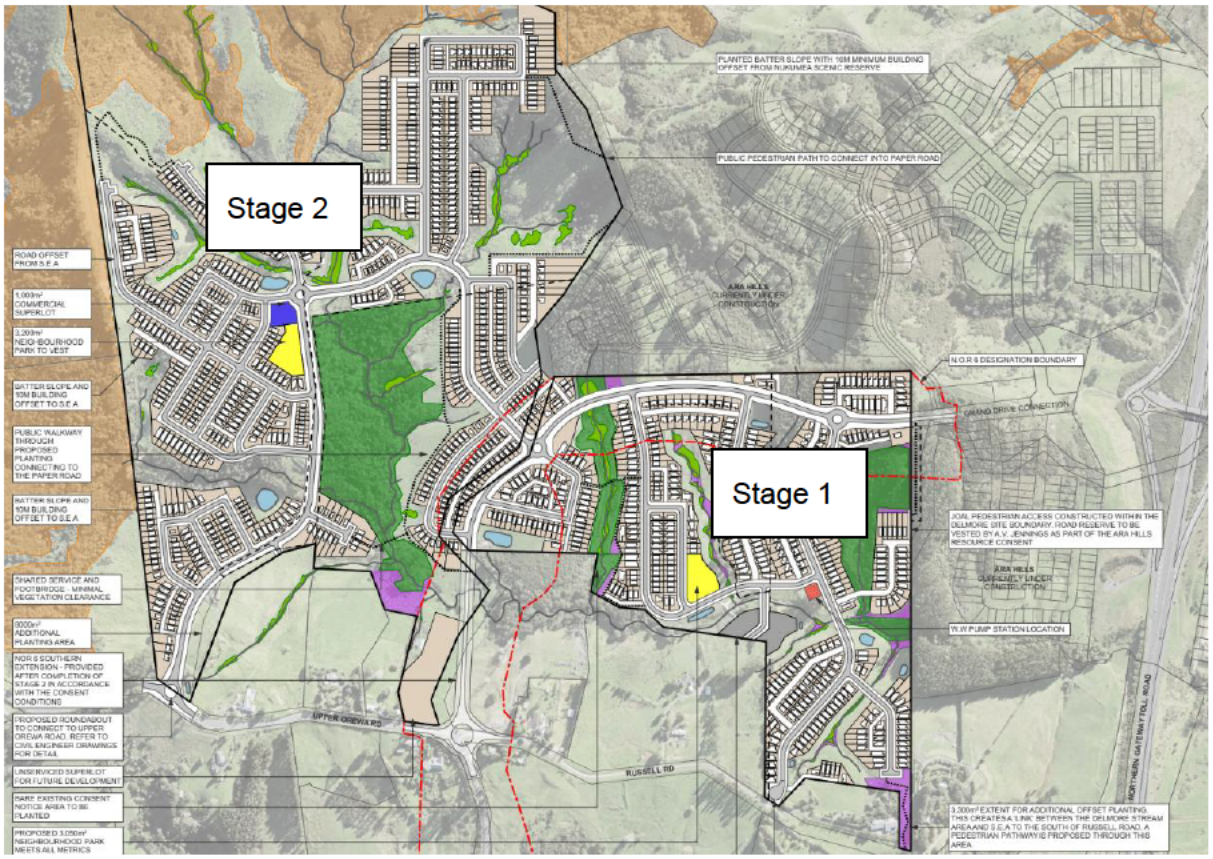
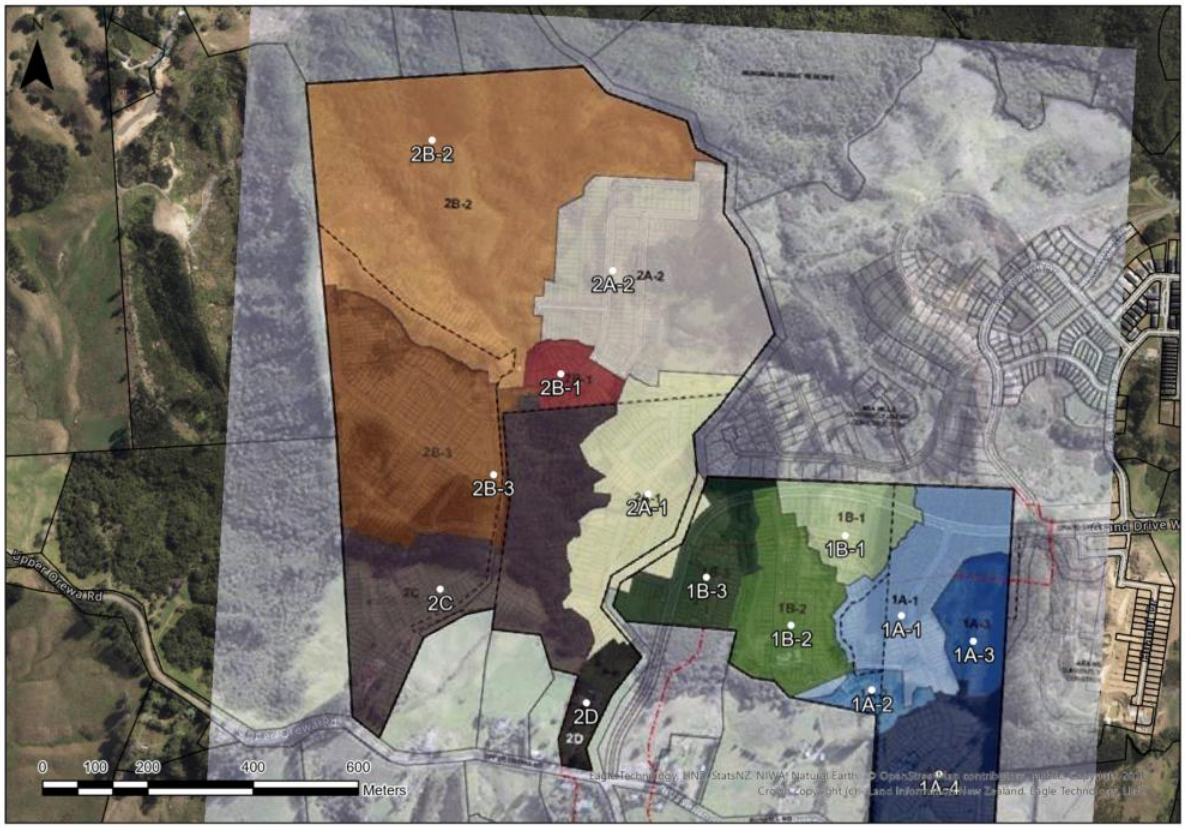


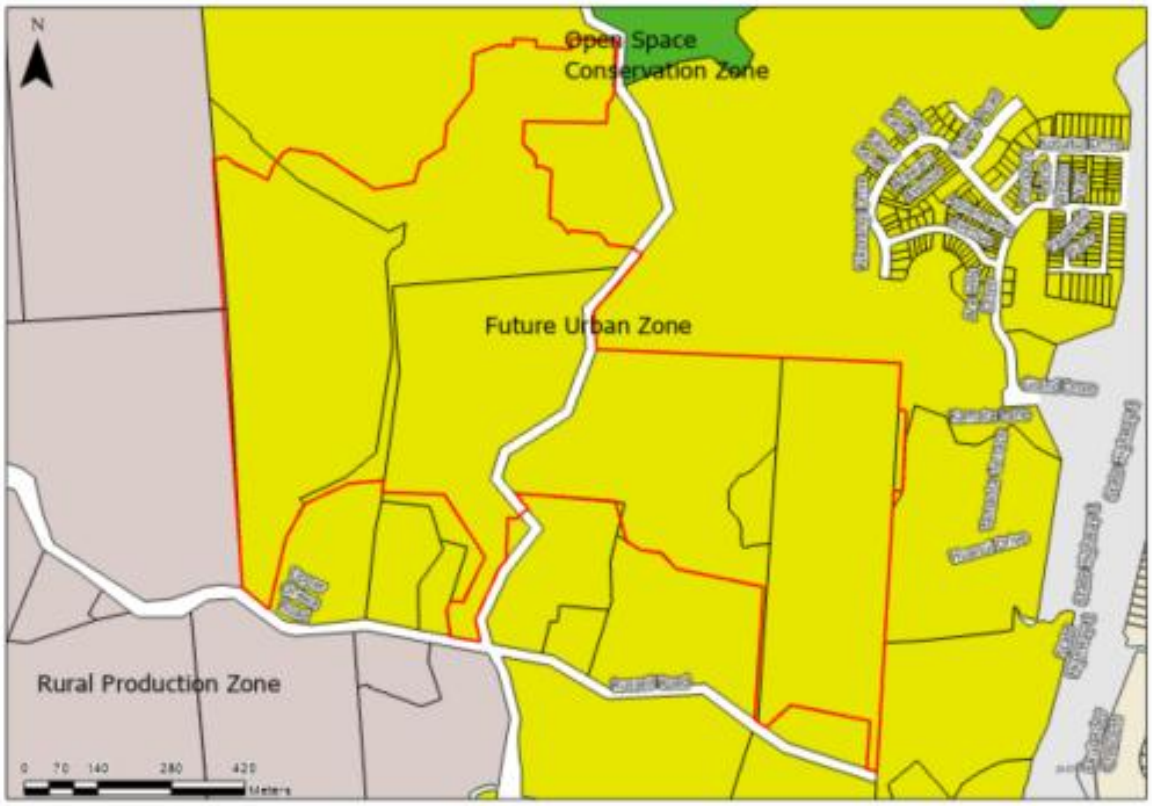
Figure 2 Stage 1

Figure 3 Stage 2



The surrounding receivers are on land currently zoned Future Urban and Rural Production in the AUP, with a small area zoned Open Space Conservation to the north, as shown in **Figure 4**. It is understood that the site and the surrounding area will be re-zoned in the future to become Residential – Mixed Housing Suburban Zone, and the assessment has considered the future zoning where relevant.

Figure 4 AUP Zoning (both main project stages shown together)



The surrounding properties which are relevant in terms of the assessed noise emission are all located toward the southern end of the project site, as shown in **Figure 5**. The receiver addresses are listed in **Table 1**.

Figure 5 Relevant Receivers

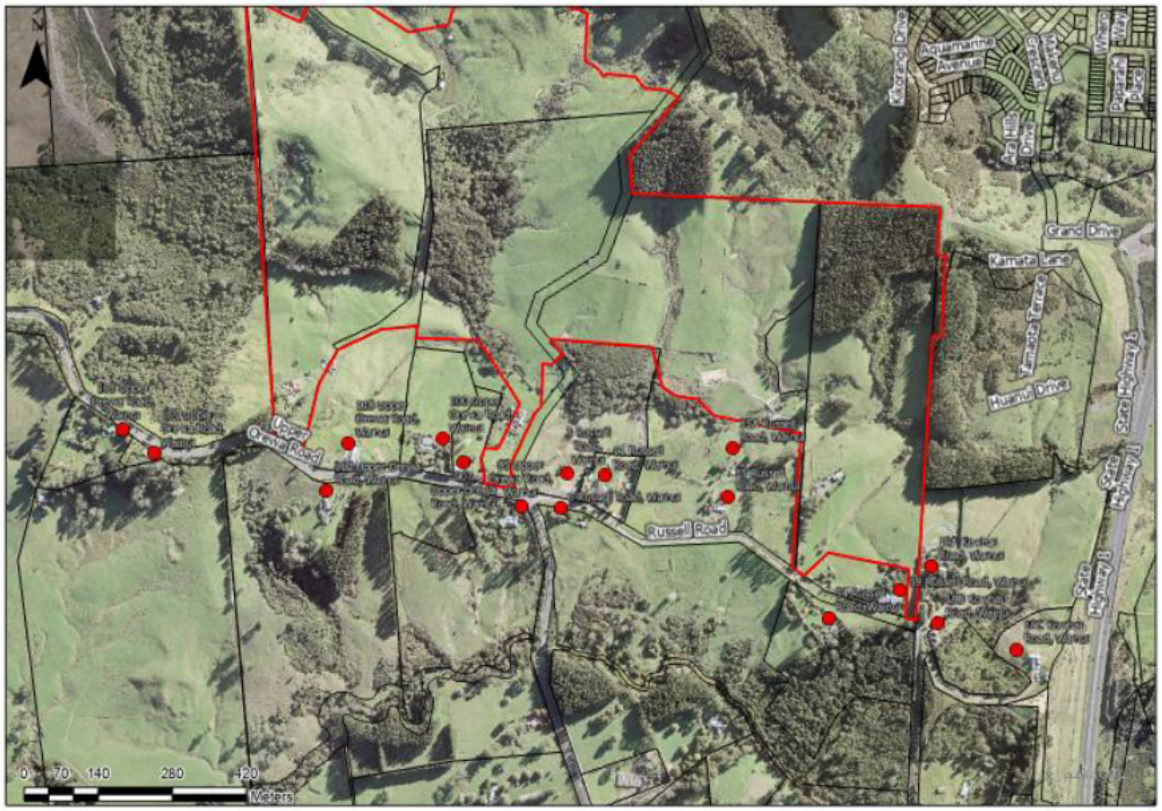


Table 1 Receivers

Receiver Address
3 Russell Road, Wainui
6 Russell Road, Wainui
11 Russell Road, Wainui
19A Kowhai Road, Wainui
19B Kowhai Road, Wainui
19C Kowhai Road, Wainui
35 Russell Road, Wainui
35A Russell Road, Wainui
54 Russell Road, Wainui
59 Russell Road, Wainui
85 Upper Ōrewa Road, Wainui
90 Upper Ōrewa Road, Wainui
100 Upper Ōrewa Road, Wainui
117 Upper Ōrewa Road, Wainui
118 Upper Ōrewa Road, Wainui
159 Upper Ōrewa Road, Wainui
163 Upper Ōrewa Road, Wainui

3.0 Performance Standards

3.1 Construction Noise

The expected total construction duration for the proposed development is expected to exceed 20 weeks. Standard E25.6.27 of the AUP states that in order to be a permitted activity, noise from construction activities for more than 20 weeks in the relevant zones must not exceed the limits in **Table 2** (for activities sensitive to noise in all zones) and **Table 3** (for any other activity).

The limits apply 1m from the facade of any building occupied during the works that contains an activity sensitive to noise. The AUP defines 'activities sensitive to noise' as:

"…Any dwelling, visitor accommodation, boarding house, marae, papakāinga, integrated residential development, retirement village, supported residential care, care centres, lecture theatres in tertiary education facilities, classrooms in education facilities and healthcare facilities with an overnight stay facility..."

Table 2 Permitted Activity Construction Noise Limits for Activities Sensitive to Noise

Day of Week	Time Period	Noise Limit, dBA	
		L_{Aeq}	Maximum L_{Amax}
Weekdays	6:30 am - 7:30 am	55	70
	7:30 am - 6:00 pm	70	85
	6:00 pm – 8:00 pm	65	80
	8:00 pm – 6:30 am	40	70
Saturdays	6:30 am – 7:30 am	40	70
	7:30 am - 6:00 pm	70	85
	6:00 pm – 8:00 pm	40	70
	8:00 pm – 6:30 am	40	70
Sundays and Public Holidays	6:30 am – 7:30 am	40	70
	7:30 am - 6:00 pm	50	80
	6:00 pm – 8:00 pm	40	70
	8:00 pm – 6:30 am	40	70

Table 3 Construction Noise Limits for All Other Activities Not Sensitive to Noise

Time Period	Maximum noise levels L_{Aeq}, dB
7:30 am – 6:00 pm	70
6:00 pm – 7:30 am	75

AUP Objective E25.2 (4) provides that *"construction activities that cannot meet noise and vibration standards are enabled while controlling duration, frequency and timing to manage adverse effects"*.

In general accordance with the guidance in NZS 6803: 1999 *Acoustics – Construction noise* and the objectives of the AUP, it is common in Auckland to permit higher noise limits during short-term high noise generating activities provided these are subject to implementation of

the best practicable options (BPO) to control effects of those activities. This is due to the limited duration of such effects and the limited available options to mitigate associated noise effects from necessary construction activities.

3.2 Construction Vibration

AUP Standard E25.6.30 states that to be a permitted activity, construction activities must be controlled to ensure resulting vibration does not exceed:

- the limits set out in German Industrial Standard DIN 4150-3 (1999): Structural vibration – Part 3 Effects of vibration on structures when measured in accordance with that Standard on any structure not on the same site; and
- the limits in **Table 4** (as transcribed from Table 1 of E25.6.30) in any axis when measured in the corner of the floor of the storey of interest for multi-storey buildings, or within 500 mm of ground level at the foundation of a single storey building.

Table 4 Construction Vibration Human Amenity Limits

Receiver	Period	Peak Particle Velocity Limit[1]
Occupied building containing activity sensitive to noise[2]	Night-time 10:00 pm to 7:00 am	0.3 mm/s
	Daytime 7:00 am to 10:00 pm	2.0 mm/s
Other occupied buildings	At all times	2.0 mm/s

1. In any axis direction.
2. As defined in the AUP.

3.3 Operational Noise

The following AUP standards relating to the operational noise emissions (noise generated onsite and received offsite) apply to the proposal according to the current zoning scheme:

- Standard E25.6.3 "Noise levels in rural and future urban zones"
- Standard E25.6.15 "Rural – Mixed Rural Zone, Rural – Rural Production Zone, Rural – Rural Coastal Zone or Future Urban Zone interface"

Both these standards provide noise limits for the reasonable protection of amenity at dwellings in rural areas. The reference noise limits, and time periods are similar, with the only difference being the location where the limits apply, being:

- at the notional boundary of occupied dwellings on Rural zoned land, and
- at or within the boundary of any residential zoned property.

The relevant noise limits are summarised in **Table 5**.

Table 5 Applicable Operational Noise Limits (Standard E25.6.3 and E25.6.15)

Time Period	Noise Level
Monday to Saturday (7:00am to 10:00pm)	55 dB L_{Aeq}
Sunday (9:00am to 6:00pm)	
All other times	45 dB L_{Aeq} 75 dB L_{AFmax}

Given the site and surrounding areas are currently zoned Future Urban, it is likely that these would be re-zoned in the future to become Residential – Mixed Housing Suburban Zone.

This approach is considered conservative, given the noise limits associated with the Residential – Mixed Housing Suburban Zone are more stringent than under the existing zone rules, as shown in **Table 6**. These limits also apply at or with the site boundary rather than at the notional boundary.

Table 6 Applicable Operational Noise Limits (Standard E25.6.2)

Time Period	Noise Level
Monday to Saturday (7:00am to 10:00pm)	50 dB L_{Aeq}
Sunday (9:00am to 6:00pm)	
All other times	40 dB L_{Aeq} 75 dB L_{AFmax}

3.4 Operational Vibration

The AUP prescribes levels for vibration from permanently installed rotating machinery when measured in any occupied unit under different ownership from the source of the vibration. The levels from AUP Section E25.6.30 in Table E25.6.3 would be applicable for vibration emission from the WWTP and are reproduced in **Table 7**.

Table 7 Vibration Levels for Stationery Machinery

Affected occupied building or area	Time of day	Maximum RMS vibration velocity 8 to 80 Hz (mm/s)
Noise sensitive spaces	7:00 am to 10:00 pm	0.2
Bedrooms and sleeping areas only within activities sensitive to noise	10:00 pm to 7:00 am	0.14

4.0 Construction Noise Assessment

The typical expected hours for construction activity are between 7:30 am to 6:00 pm Monday to Saturday. Outside of these hours, including on Sundays and public holidays, it is understood that site activity would only include low noise generating activity such as tool-box talks, site layout and planning, light vehicle movements, and administration activities.

The highest levels of construction noise tend to be associated with the operation of large machinery associated with excavation (including rock breaking), piling and compaction works. The activity is expected to comprise a range of equipment used across the extent of the entire site which is marked in red in **Figure 4**.

There could also be assessable noise related to temporary dewatering equipment and laydown areas.

A summary of typical equipment and reference noise levels has been provided in **Table 8**. The noise levels are based on in-house measurements and published data taken from BS 5228 - 1:2009 *Code of practice for noise and vibration control on construction and open sites – Part 1; Noise.*

The noted setback distances to compliance have been calculated in accordance with the methodology in NZS 6803:1999 and include facade corrections.

Table 8 Mobile Plant Items and Typical Noise Emission Levels

Activity	Plant Item/s	Plant Noise Level at 10 m, dB L_{Aeq}	Approximate setback distance to compliance[1] (without mitigation), metres	Approximate setback distance to compliance (with mitigation)[2], metres
Earthworks	Dozer, scraper, excavator, dump truck working in a group in the same area.	88	110	40
Rock breaking	Excavator with rock hammer attachment (includes acoustic shroud).	83	60	30
Demolition	Excavator (≤20 ton) with bucket or processor attachment.	75	25	10
Piling for retaining walls in Stage 1[3]	Excavator (≤20 tons) fitted with piling attachment.	79	40	20
Compaction[4]	Vibratory Compaction Roller (10-15t)	80	45	15

Notes on **Table 8**:

(1) AUP compliance level is 70 dB L_{Aeq}, during the daytime (7:30am to 6:00pm).

(2) Based on acoustically effective screening between the noise source and receiver.

(3) Piling for retaining walls only anticipated for Stage 1, based on the current design information.

(4) Setback distance with mitigation is based on six movements (passing by an individual receiver) within 15-minutes as the plant is expected to be moving across the site and not idling/stationary at one location.

While most noise emission from the equipment in **Table 8** is reasonably steady state, there could be instantaneous maximum noise events that cause levels in the order of 10 to 15 dB higher than those presented. The noise limit for these transient noise events is 85 dB L_{Amax}. We expect that compliance with the L_{Aeq} based noise limits would also result in compliance with the L_{Amax} based limit.

Relatively stationary plant items such as dewatering equipment and activity associated with laydown areas can be effectively managed by siting these activities away from the adjacent receivers and locally screening if required. This strategy should be included in the project detailed construction planning stage, as noise associated with these sources are likely to occur outside of standard daytime hours and the noise limits are much lower outside of standard daytime hours.

Indicative buffer distances to achieve compliance with the night-time construction noise limit are listed below, these would need to be reviewed and updated as the specific plant is known:

- Dewatering plant – 500 m without noise mitigation, 150 m with noise mitigation.
- Laydown area activity - 800 m without noise mitigation, 250 m with noise mitigation.

4.1 Expected Construction Noise Levels (without mitigation)

The assessment has shown that construction of the project (without noise mitigation) can achieve the noise limits at most receivers, with the following exceptions:

- 19A Kowhai Road – 6 dB exceedance during Stage 1A-4 earthworks only.
- 19B Kowhai Road – 5 dB exceedance during Stage 1A-4 earthworks only.
- 59 Russell Road – 10 dB exceedance during Stage 1A-4 earthworks only.
- 85 Upper Ōrewa Road – 1 dB exceedance during Stage 2D earthworks only
- 90 Upper Ōrewa Road – 5 dB exceedance during Stage 2D earthworks only.

Recommendations for management and mitigation of noise are given in **Section 4.2**.

Noise from other construction related activities (such as road truck and light vehicle movements, and construction of water treatment facilities) would be quieter than those assessed and are not expected to contribute such that it would cause elevated cumulative noise levels. For most of the construction period, noise levels are expected to be lower than the AUP permitted noise limit.

4.2 Construction Noise Mitigation and Management

Noise mitigation and management would be required for the following receivers:

- 19A Kowhai Road –during Stage 1A-4 earthworks only.
- 19B Kowhai Road –during Stage 1A-4 earthworks only.
- 59 Russell Road – during Stage 1A-4 earthworks only.
- 85 Upper Ōrewa Road – during Stage 2D earthworks only.
- 90 Upper Ōrewa Road – during Stage 2D earthworks only.

The use of temporary noise barriers would be expected to reduce construction noise to mostly compliant levels. The noise barriers should be located parallel to the common site boundaries and be of sufficient height to more than just block the line of site between the activity and the receiving building facade.

An effective noise barrier can provide approximately 10 dB of noise reduction and should be maintained throughout the relevant activity period, being relocated as required to provide effective screening.

For information, an image of a temporary noise barriers used to control construction noise is shown in **Figure 6** and **Figure 7**.

With noise barriers in place, compliance with the noise limits would be expected at all properties bar one. A potential marginal exceedance of 1 to 3 dB is still possible at 59 Russell Road during Stage 1A-4 earthworks only. All of the Stage 1A-4 earthworks are expected to be completed in one week, with only a limited portion of that time involving works close to 59 Russell Road.

Figure 6 Temporary Noise Barrier - Example 1

Figure 7 Temporary Noise Barrier – Example 2

The panels should be constructed from materials with a surface mass of at least 7 kg/m^2 and be at least 1.8 m high. The noise barrier panels should be abutted or overlapped to provide a continuous screen without gaps at the bottom or sides of the panels. The barriers should extend sufficiently on either side of the activity area to more than break the line of sight between the noise source and the receiving buildings.

Suitable materials include plywood (e.g., 17mm thick) or proprietary noise barrier panels hung from mesh fencing such as the following types:

- Duraflex Noise Control Barrier - Performance Series
- Soundex Acoustic Curtain - Performance Series

Alternatives should be approved by a suitably qualified acoustic specialist because some proprietary noise curtains may have insufficient surface mass for general use.

For the receiver at 59 Russell Road, we recommend consulting with the occupant prior to commencing the work to investigate options for timing the activity closest to the receiver to limit the effect of noise from the construction activity.

It is most common for the mitigation and management measures to be included in a Construction Noise and Vibration Management Plan (CNVMP). A CNVMP sets out the procedures for the contractor to manage and mitigate construction noise and vibration effects and adopt the best practicable options. To ensure the appropriate level of mitigation is implemented it is recommended that the requirement for a CNVMP is included as a condition of consent. A proposed condition is included within **Section 8** of this report.

Options for managing the effects of construction noise at the receivers could include the use of temporary noise barriers, selecting quiet plant and equipment, or scheduling of activity to times most suitable for the receivers. The best practicable options can be determined during preparation of the CNVMP when there is typically more detail available regarding the detailed project design.

4.3 Construction Noise Effects

Conventional residential buildings (façade elements like weatherboard and standard glazing) can typically reduce external noise levels by 20 - 25 dB.

At most surrounding properties, other than 59 Russell Road, external noise levels would be at or below the AUP limit – being below the limit for the majority of the time. Internal noise would be less than 50 dB L_{Aeq} during the noisiest works and would be audible within the building if quiet activities are occurring.

Internal noise levels in rooms within 59 Russell Road facing the works may reach approximately 50 dB L_{Aeq} during the closest works. At these levels, concentration may be affected but residential and office activities can generally continue. Sound levels for television, radio, and phone conversations would need to be slightly raised. These levels would be expected for a duration of less than one week.

On this basis, if the noise control measures identified in **Section 8** are adopted, construction noise effects would be reasonable.

5.0 Construction Vibration Assessment and Mitigation

It is worth noting that the principal concern of receivers regarding vibration relates to the potential damage to their property, rather than impact on their amenity – noting that a certain level of amenity impact is expected and common during construction (as is the case with noise). Such effects are commonly accepted with prior advice, e.g., via letter drop, to make occupants aware ahead of the works beginning.

5.1 Piling

Piling is expected to be undertaken at locations in Stage 1 during the construction of retaining walls. The nearest piling location to a receiver is understood to be approximately 130 metres from the dwelling at 35 Russell Road. At that separation distance the level of

piling vibration received at the dwelling would be expected to comply with the AUP requirements by some margin. As such, no specific management or mitigation of piling vibration is recommended.

5.2 Rock Breaking

At the time of writing the specific locations of rock breaking are not known, this section therefore provides guidance around managing effects should rock breaking be required close to dwellings.

Vibration from an excavator using a 900 kg rock hammer can be in the order of 2 to 3 mm/s on the foundation of a structure (building) located ten metres from the activity. The closest parts of 59 Russell Road (dwelling) and 90 Upper Ōrewa Road (domestic car garage) have buildings within ten metres of the project site boundary. Therefore, compliance with the AUP amenity requirements (being no higher than 5 mm/s for up to 3 days) would be expected so long as any rock breaking within 10 m of these structures takes no more than 3 days to complete. This is understood to be achievable based on discussions with the project team. The avoidance of cosmetic damage limits (being higher than the amenity limits) are expected to be met at all properties.

Vibration from rock breaking can be managed to comply by ensuring that appropriately sized equipment is used if rock breaking needs to be undertaken within 10 metres of adjacent receiving structures. This can be confirmed through vibration monitoring of the activity at locations separated from receivers a technique which has been successfully implemented on multiple sites across Auckland. The procedure for this would be set out in the CNVMP.

All other potentially occupied buildings are set back more than 15 metres from potential rock breaking activity and compliance with the AUP requirements would be expected at these locations.

5.3 Compaction

Vibration from a 10 tonne vibratory roller could be in the order of 2 to 3 mm/s on the foundation of a structure (building) located ten metres from the activity. These levels should be considered indicative only due to the potential difference in machinery, ground conditions and other variable factors. The closest receiving building (the domestic car garage at 90 Upper Ōrewa Road) is located close to the project site boundary and vibratory compaction activity could potentially cause non-compliance with the AUP requirements for cosmetic damage. This could be mitigated to compliance by using a static rolling or plate compactor methodology if compaction is required close to 90 Upper Ōrewa Road.

It is recommended that the applicant undertake vibration monitoring at the adjacent structures at the initial stages of compaction, if vibratory compaction needs to be undertaken within five metres of adjacent receiving structures. Alternatively, investigate options for compaction using non-vibratory methods for that part of the site, if required. This matter should be addressed in the CNVMP.

6.0 Wastewater Treatment Plant (Operational Noise)

Stage 1 will include installation of a wastewater treatment plant (WWTP) located within Stage 1A-2. The WWTP will typically operate 24 hours per day, seven days per week, however there may be periods where the WWTP is largely bypassed under an alternative temporary operating condition which has been described further in **Section 6.1.4**. As such, the most stringent noise limit (based on the assumed future zoning) for WWTP operational noise would be 40 dB L_{Aeq} and 75 dB L_{AFmax}.

6.1 WWTP Noise Assessment

The design of the WWTP building construction type comprises pre-cast concrete walls, acoustic louvred openings and a plywood lined metal deck roof.

Based on the indicative noise source emission levels provided by the applicant the combined sound power level for the sources housed inside the WWTP building is expected to be approximately 95 dBA SWL, with a noise source outside the building at 60-65 dBA SWL. A 5 dB adjustment for special audible characteristics (SAC) has been included in the below assessment and advice to provide a conservative assessment of effects on the assumption that the plant could exhibit tonal qualities.

Based on a conservative combined building facade reduction of 15 dB (accounting for the louvre openings), compliance with the future zone AUP noise limit (40 dB L_{Aeq}) would be expected at the nearest residential site boundaries within the surrounding Stages (1A-1, 1C, 1A-3) and at the notional boundary of the nearest existing receiver at 35A Russell Road. To meet the future Residential zone noise limit at or within the legal boundary of 35A Russell Road may require orienting openings in the building away from the boundary and/or installing acoustically effective screening on the common boundary. The details of whether this is required and what form the mitigation would take would need to be defined during the detailed design of the WWTP when more detail of the equipment and WWTP building design is known.

It is understood that the WWTP capacity may need to be increased at some stage in the future, beyond the design which has been assessed in this report. It is anticipated that any future upgrades to the WWTP, such as to increase treatment capacity if the need arises, can be designed and constructed to maintain compliance with the noise limits through careful plant selection and standard mitigation measures. Further, given the noise emission from the WWTP would be reasonably steady-state, compliance with the L_{Aeq} based noise limit would be expected to also result in compliance with the L_{Amax} based noise limit.

The proposed location of the WWTP and the WWTP layout is shown in **Figure 8** and **Figure 9**.

Figure 8 WWTP Location

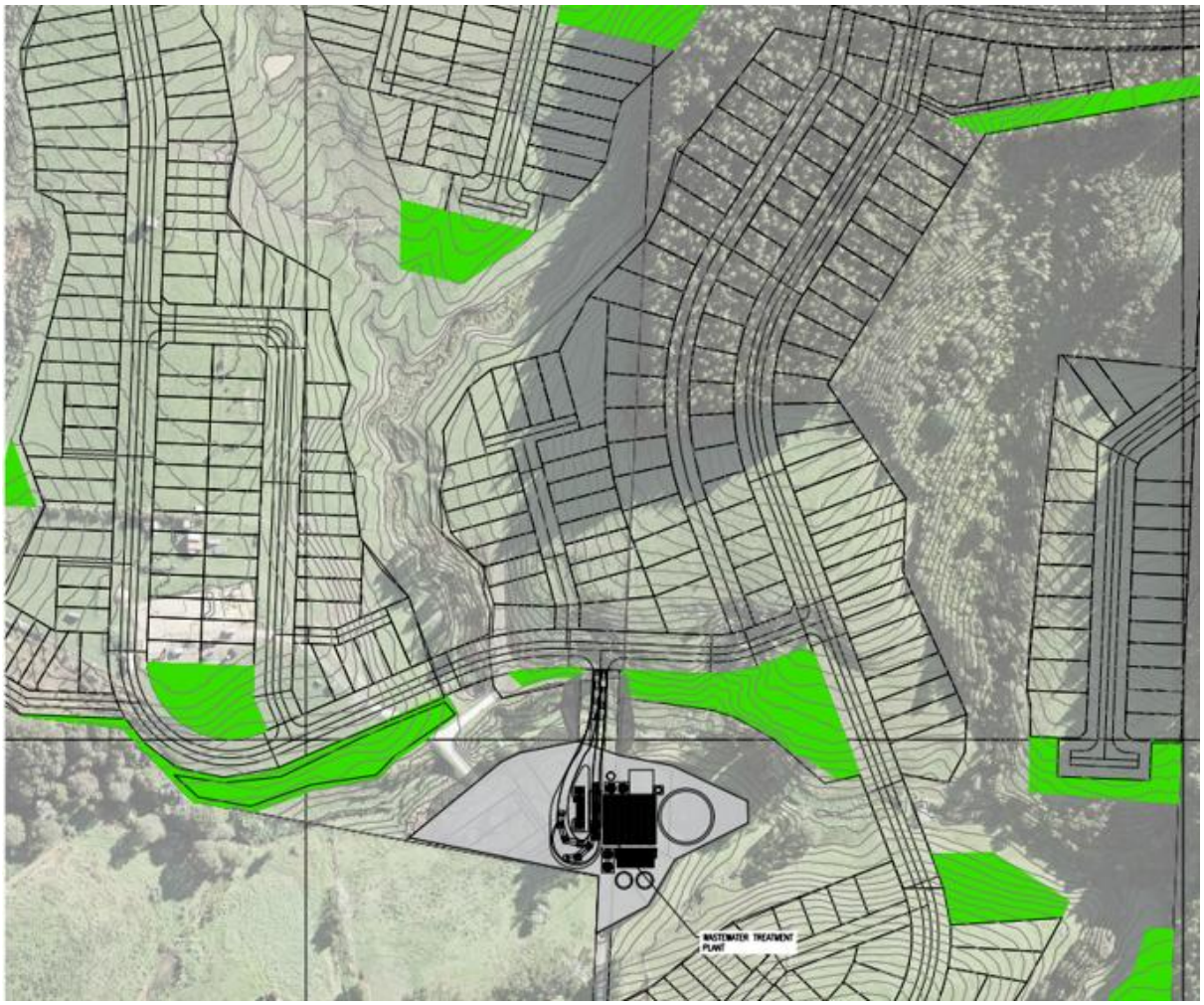
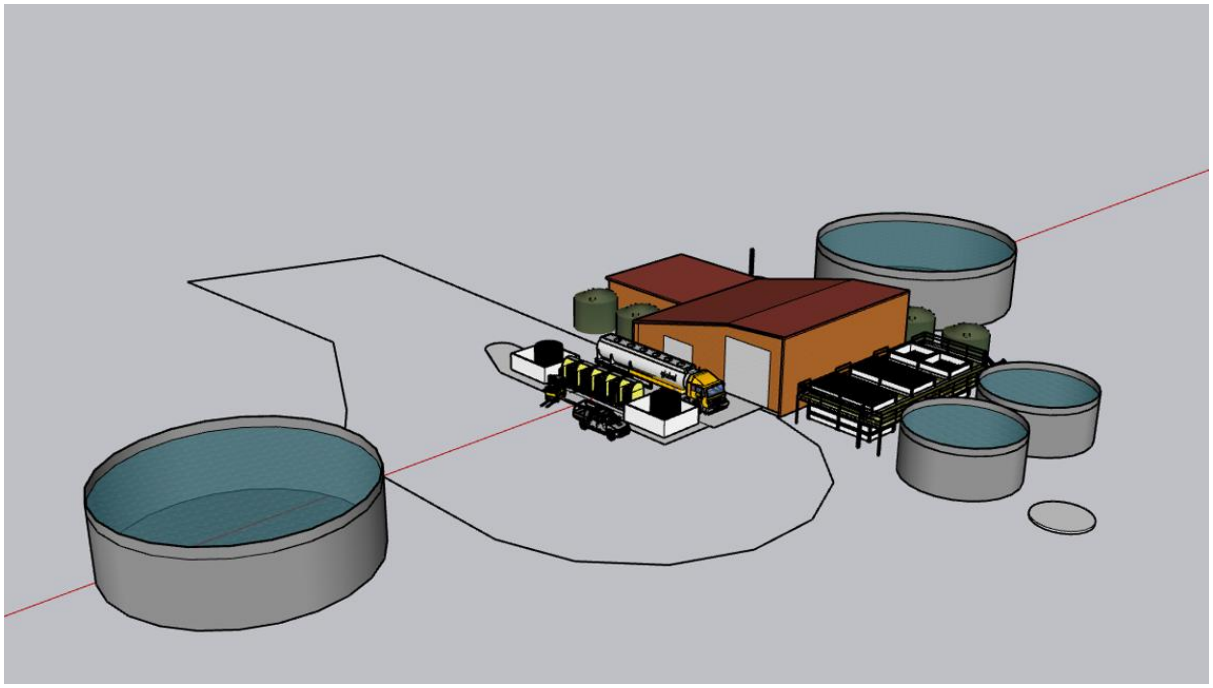


Figure 9 WWTP Indicative Layout



6.1.1 Water Treatment

The building will contain water treatment equipment for processing water from ground bores, which will supply potable water for the development. Noise from the related pumps and filtration and disinfection equipment would be expected to be adequately controlled by the building construction. Potable water would be stored in a reservoir outside the building.

6.1.2 Pump Station

It is understood there will be a pump station located centrally within the project site. While detail of the pump station was not available at the time of writing, it is understood that any associated above-ground pump equipment will be contained within a purpose-built pre-cast concrete building with solid roof and minimal opening for ventilation. As such, noise emission from the pump station is expected to be well controlled and not likely to cause any adverse effects at surrounding lots.

6.1.3 Removal of Treated Wastewater and RO Reject (Typical operating condition)

Under typical operating conditions, the WWTP would discharge treated wastewater on site, with some liquid waste and sludge removal undertaken using waste removal trucks. Three trucks would be required per week and would visit the site during daytime hours. The noise from the truck activity at the WWTP is expected to comply with the most stringent daytime noise limit of 50 dB L_{Aeq} at the relevant receiver locations.

6.1.4 Untreated Wastewater Removal (Alternative operating condition)

Under this scenario, waste material would bypass the WWTP, be stored in tanks, then be pumped to a remote truck filling point. The collection of sludge by waste removal trucks from the WWTP would occur as usual during this period. The proposed truck cartage routes are the same as in the scenario above.

The relative locations of the WWTP and remote filling point are shown in **Figure 10**, and the proposed truck cartage routes are shown in **Figure 11**.

Figure 10 WWTP and Remote Filling Point Location

Figure 11 Proposed Truck Transport Routes

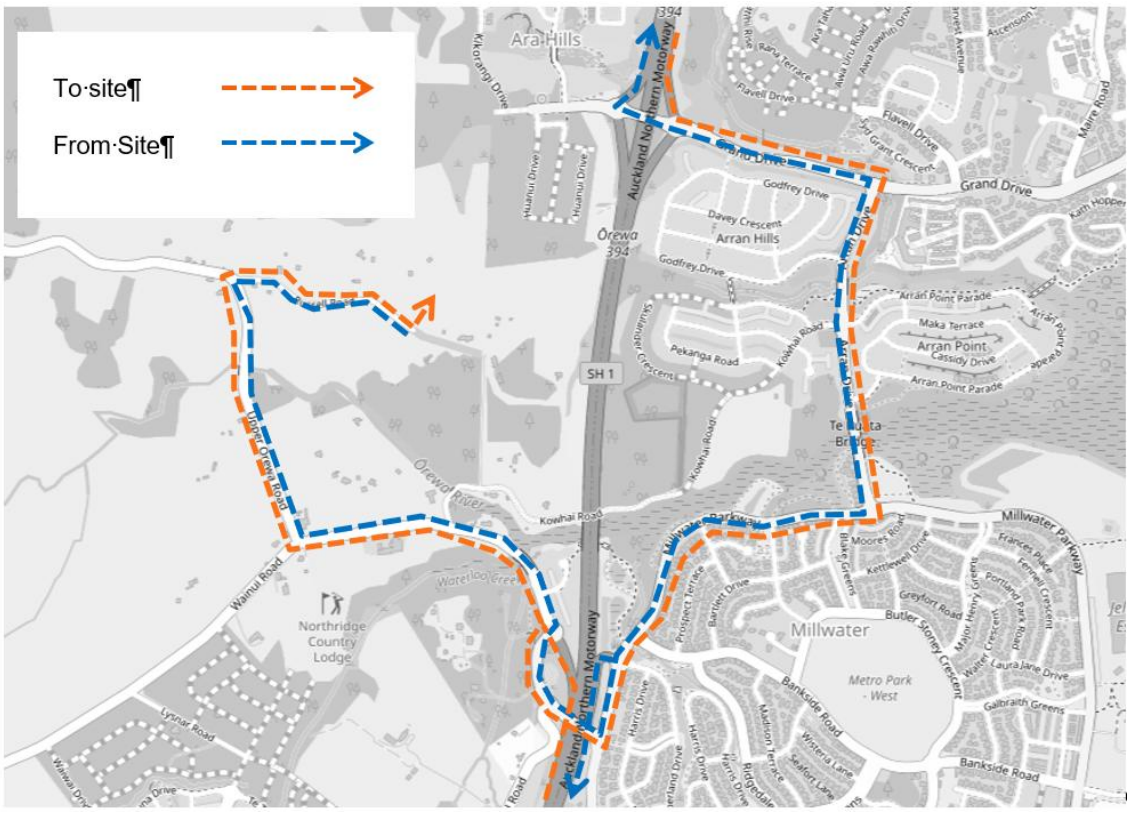


Image source: Commute letter.

6.1.4.1 Additional Truck Activity

The additional truck activity considered relevant in terms of noise emission relates to truck movements at the truck filling point and the transport of material on public roads, noting that noise from vehicle movements on public roads is not controlled by the AUP. The following sections provide an assessment of these sources of noise.

6.1.4.2 Number of Truck Movements

The expected quantity of truck movements associated with transport of the waste material from the truck filling point is provided in the Commute report as follows:

> *The majority of the time (99%) there will be up to one truck (two movements) per hour. Even outside this time, there will in practice only ever be three truck movements per hour.*

The memo is based on a Fonterra truck and trailer tanker which has a capacity of 28.8 m³.

6.1.4.3 Truck Filling Point

It is understood the waste material would be pumped under pressure from the WWTP to the truck filling point, and the trucks would simply accept the flow from a fill coupling. As such, noise associated with truck filling activity would comprise noise from the truck moving or sitting at idle. Trucks would generally take material from the filling point during standard hours (Monday to Saturday 7:00 am to 10:00 pm) however there may be instances when material collection is undertaken outside of those hours.

External Receivers

The nearest part of the truck filling area is approximately 105 m from the nearest noise assessment location, being the receiver at 54 Russell Road. Assuming the truck arrived at the filling area and the truck engine was switched off within approximately five minutes, at 54 Russell Road the predicted noise level from truck movements in the truck filling area would be 30 dB $L_{Aeq(15\ min)}$, compliant with the night-time noise limits. Noise from the operation of the WWTP would not significantly contribute to noise at this receiver. As such, the effects of noise from the truck activity at external receivers would be considered reasonable.

Based on measurements of truck noise the typical difference between the L_{Aeq} noise emission level and the L_{Amax} noise emission level ranges from 5 to 15 dB. As such, compliance with the L_{Aeq} based noise limit would be expected to also result in compliance with the L_{Amax} based noise limit.

Internal Lots

The latest lot plan, included in **Figure 12**, indicates the truck filling activity could be within approximately 45 to 55 m of the nearest proposed residential lots to the north-east, and directly adjacent to lots to the north.

Figure 12 Proposed Truck Filling Point

Unmitigated noise levels from the truck filling point activity can be summarised as follows:

- Predicted to comply with the daytime and night-time noise limits at the nearest lots to the north-east of the truck filling area.
- Predicted to comply with the daytime noise limit but exceed the night-time noise limit at the adjacent lot to the north.

An acoustic barrier would likely be the most effective option for reducing noise from the truck filling area. An acoustically effective barrier at least 3.0 m high on the alignment marked in Figure 13 is predicted to result in a noise level of 41 dB $L_{Aeq(15\ min)}$ at a single storey dwelling located on the nearest lot to the north, which would be imperceptibly different to the night-time noise limit. As such, the effects of noise from the truck activity at the filler point at the proposed internal lots would be considered reasonable.

Figure 13 Acoustic Barrier – Example Alignment

6.1.4.4 Road Traffic Noise on Public Roads

As noted previously, noise from vehicle movements on public roads is not controlled by the AUP. The information in this section is provided for information purposes.

The existing road traffic volumes (prior to the development being occupied) for the proposed waste transport routes between the site and State Highway 1 were taken from the Mobileroad[1] database. The traffic volumes and composition for the relevant sections of road along the proposed routes are shown in **Table 9**.

[1] https://mobileroad.org/desktop.aspx, viewed 17 June 2025.

Table 9 Daily Road Traffic Data – Existing (pre-project)

Road	Traffic Volume ADT	% Heavy Vehicles
Russell Road	92	4
Upper Ōrewa Road	1,342	5
Wainui Road	1,478	20
Grant Drive	17,012	5
Arran Drive (North end)	6,729	11
Arran Drive (South end)	9,263	6
Millwater Parkway	4,024	4

It can be seen from Table 9 that the local road network routes between the site and State Highway 1 already includes existing heavy vehicle movements.

The Commute report states:

> *In all cases the hourly volume of trucks will be two movements or less (one truck visit). Even using the 99%ile Scenario 2 truck number (15 trucks per day) translates to 30 movements per day.*

The additional of 30 heavy vehicle movements (worst case scenario, during peak rainfall event) on the public road network, to and from the truck filling point, would be expected to cause less than a 0.5 dB increase in overall road traffic noise at receivers along most of the proposed route. This change in noise levels is sufficiently small that it would not be expected to be noticeable.

The overall road traffic noise levels at receivers along Russell Road may increase by up to 1.5 dB. While individual truck movements along the road may notably increase, the overall change in noise levels is sufficiently small that it would not be expected to be noticeable over the course of a day. Further, the actual road traffic noise levels at receivers along Russell Road, given the low traffic volume, would remain reasonable in terms of noise effects.

7.0 Operational Vibration

The WWTP will be located in a stand-alone building which will not be structurally connected to any adjacent noise sensitive spaces. The WWTP building which houses the majority of the rotating machinery would be located approximately 25 metres from the nearest receiving site boundary and approximately 55 metres from the nearest proposed residential site within Stage 1A-1. As such, vibration from the WWTP is expected to comply with the AUP requirements without specific vibration mitigation and the effect of vibration would be reasonable.

8.0 Conditions

The following conditions are recommended to provide suitable control of construction noise and vibration levels.

1. At least 20 working days prior to the commencement of bulk earthworks for any stage or sub-stage of the development, the consent holder must prepare and submit to Council for certification a Construction Noise and Vibration Management Plan (CNVMP).
2. The objective of the CNVMP is to identify and implement the best practicable options to minimise adverse construction noise and vibration effects. The CNVMP must be prepared with reference to Annex E of *NZS 6803:1999 Acoustics – Construction noise* and must include as a minimum:
    a. Applicable site noise and vibration criteria (limits);
    b. Programme of works and hours of operation;
    c. Identification of surrounding noise and/or vibration sensitive receivers;
    d. Details of the specific management and mitigation measures required to comply with the relevant noise and vibration criteria;
    e. The requirement to provide written communication to occupants of all immediately neighbouring buildings prior to the commencement of activities on site. The written advice shall set out:
        - a brief overview of the construction works;
        - the working hours and expected duration;
        - all mitigation measures to be implemented;
        - the procedure for recording concerns/complaints regarding noise and vibration;
        - the procedure for noise and vibration monitoring where concerns are raised by receivers; and
        - contact details for site personnel for any concerns regarding noise and vibration.
3. Noise arising from earthworks and construction activity on-site shall not exceed the following limits when measured or assessed at any building on any other site that is occupied during the works in accordance with the requirements of NZS6803:1999, where affected party approval has not been obtained.

    59 Russell Road

    75 dB L_{Aeq} during earthworks.

    Noise limits in Standard E25.6.27 at all other times

    All other properties

    Noise limits in Standard E25.6.27 at all times.
4. If vibration levels from earthworks or construction activity exceeding 2 mm/s are predicted or measured in any axis when measured in the corner of the floor of the storey of interest for multi-storey buildings (if applicable), or within 500 mm of ground level at the foundation of a single storey building, the consent holder must consult with the relevant occupants to:
    a) Discuss the nature of the work and the anticipated days and hours when the exceedances are likely to occur;
    b) Determine whether the exceedances could be timed or managed to reduce the effects on the receiver; and

c) Provide in writing, no less than three days before to the work begins, details of the location and duration of the works, a phone number for complaints and the name of the site manager.

5 An acoustic fence must be constructed along the southern boundary of Lot 203 in accordance with the noise assessment titled "Delmore Residential Development, Wainui" prepared by SLR and dated 18 December 2025.

The purpose of the acoustic fence is to ensure compliance with the applicable noise standards under the Auckland Unitary Plan, as referenced below.

Time Period	Noise Level
Monday to Saturday (7:00am to 10:00pm)	50dB LA_{eq}
Sunday (9:00am to 6:00pm)	
All other times	40dB LA_{eq}
	75dB LAF_{MAX}

9.0 Conclusion

SLR has been commissioned to undertake an assessment of noise and vibration effects associated with the Delmore Residential Development proposal (the project) which comprises development of approximately 1,200 residential lots in Wainui (Upper Ōrewa), Delmore. The project would be undertaken in two stages, with each stage being separated into sub-stages.

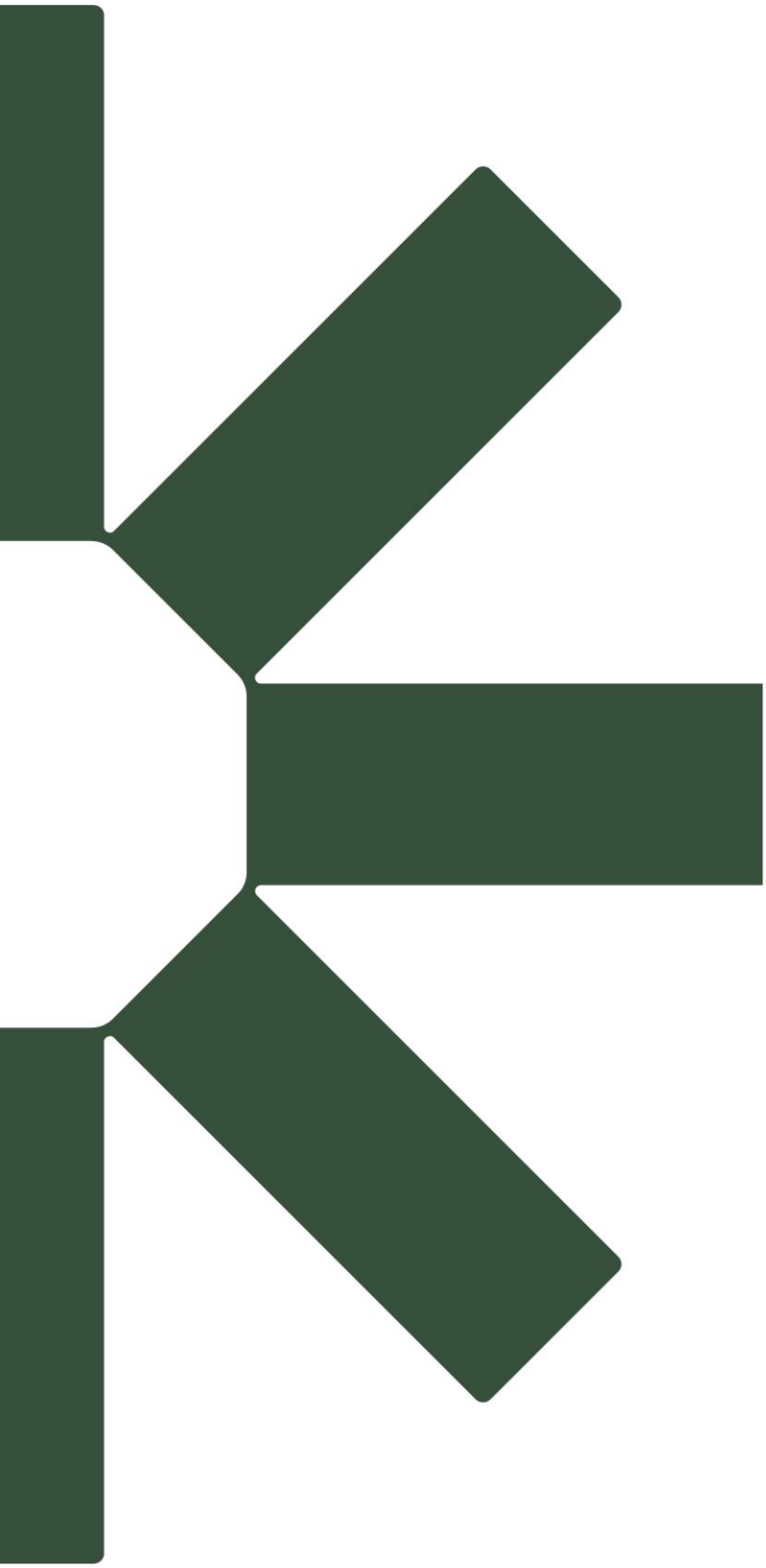
The assessment comprised consideration of the following for both stages of the project:

- Construction noise and vibration emission associated with the civil site works.
- Operational noise and vibration emission from the proposed wastewater treatment plant (WWTP), located within Stage 1A-2.

The findings of the assessment can be summarised as follows:

1. Noise mitigation measures to control noise levels generated by construction works have been recommended for five receivers during earthworks planned in the adjacent areas only.
2. With mitigation measures in place, including acoustic screening, Standard E25.6.27 of the AUP (long-term construction noise limits) may be temporarily exceeded by up to 5 dB at one receiver only during works in the proximity, being 59 Russell Road. The effects of this infringement can be described as reasonable as the duration of infringement is less than one week. Further, concentration may be affected but residential and office activities can generally continue at the resultant internal noise levels during the infringement.
3. It is expected that construction vibration can be managed to comply with Standard E25.6.30(1) relating to construction vibration, using vibration monitoring or alternative compaction methods. Vibration monitoring has been recommended if vibration intensive construction activity (rock breaking) is required to be undertaken at locations close to receivers.
4. Operation of the WWTP can comply with the with the AUP requirements prescribed within E25.6.2, E25.6.3, E25.6.15 and E25.6.30. Future upgrades to the WWTP, such as to increase capacity, can be designed to maintain compliance.

5. Operation of the WWTP filling station can comply with the AUP requirements, subject to the construction of an acoustic fence along the southern boundary of Lot 203.
6. Overall, with the recommended mitigation and design measures in place the anticipated noise and vibration effects from the project are expected to be reasonable.



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